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Storage Policy Management

John Hayden

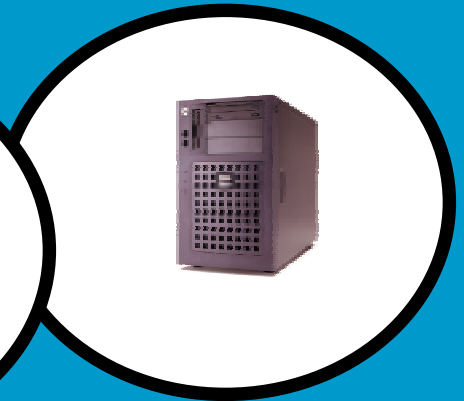
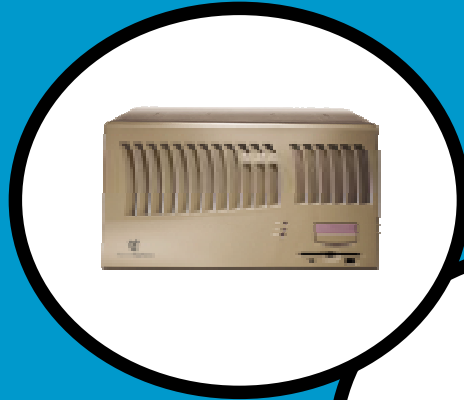
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The evolving challenge...

Where we are coming from....



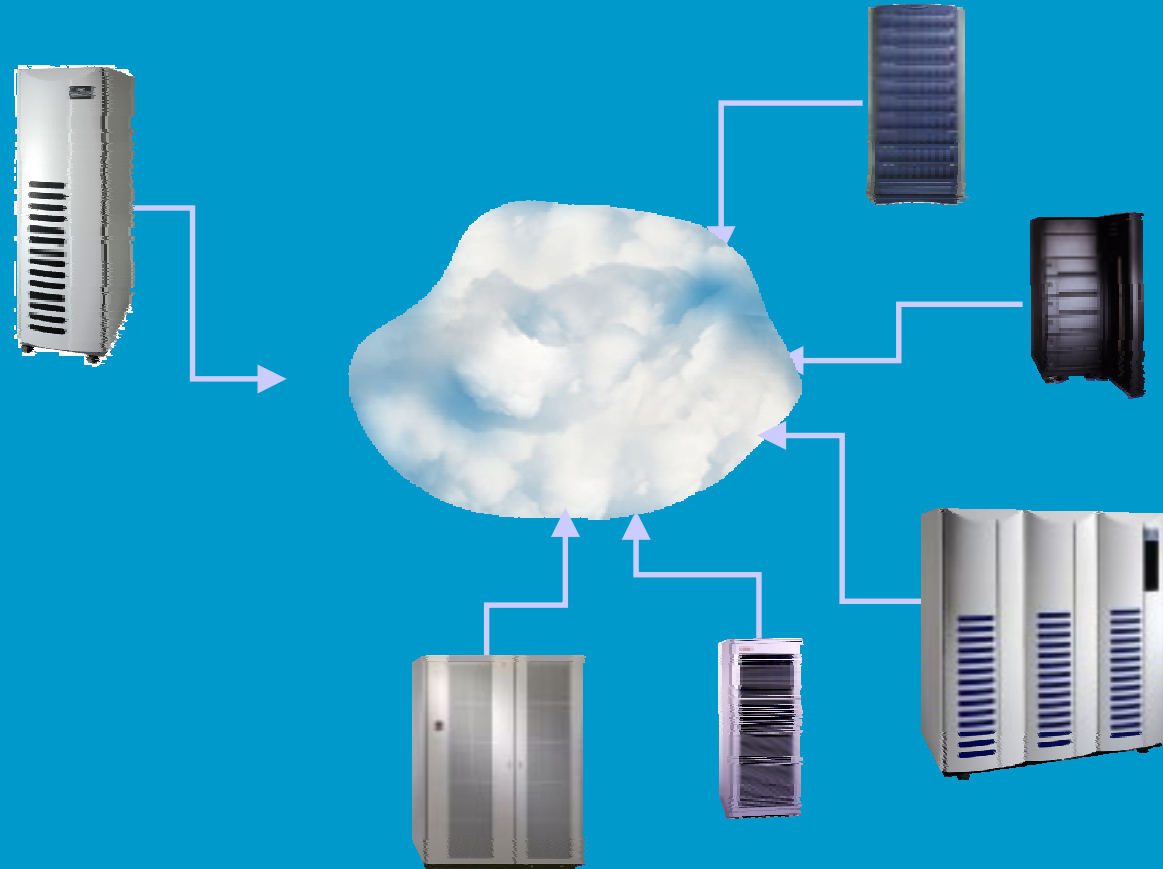
*Captive storage, simple tiers
defined by that captive storage...*

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Where we are today...



***NAS Devices are SAN enabled,
and becoming SAN agnostic...***

NFS Industry Conference



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The challenge

- The integration of Open SAN initiatives is non-trivial

(an approachable problem that we are overcoming)

- Multiple tiers of storage create the need to integrate business rules into storage policies....

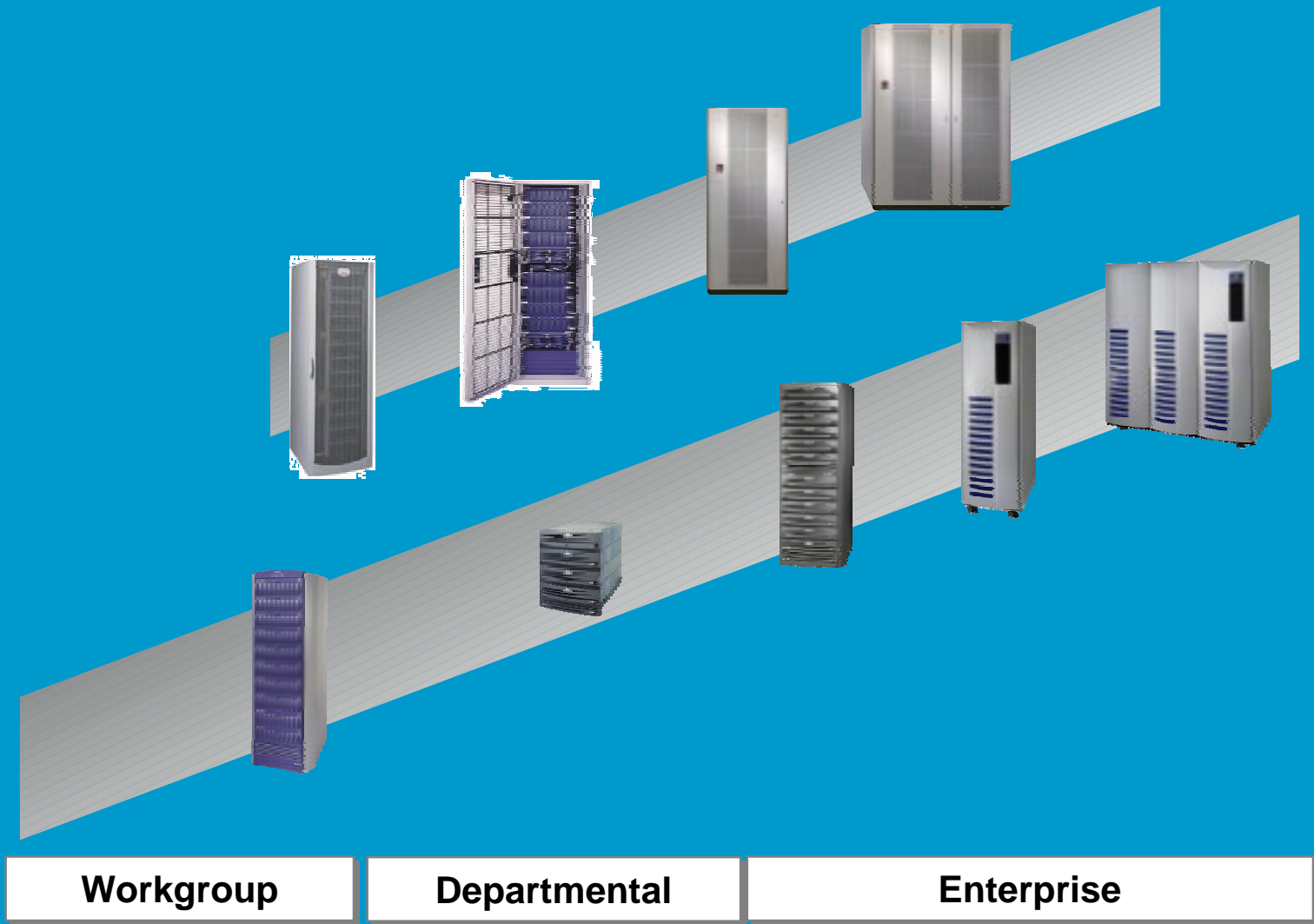
(our customer's barrier to adoption = our problem)



Storage is Tiered

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Performance and Availability



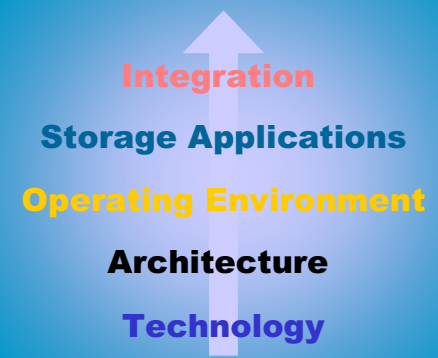


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Storage Tier Differentiators

- Important Differentiators:

- Availability
- Scalability
- Performance
- Imbedded Functionality
 - Mirroring, Replication etc.
- Footprint
- **Cost**

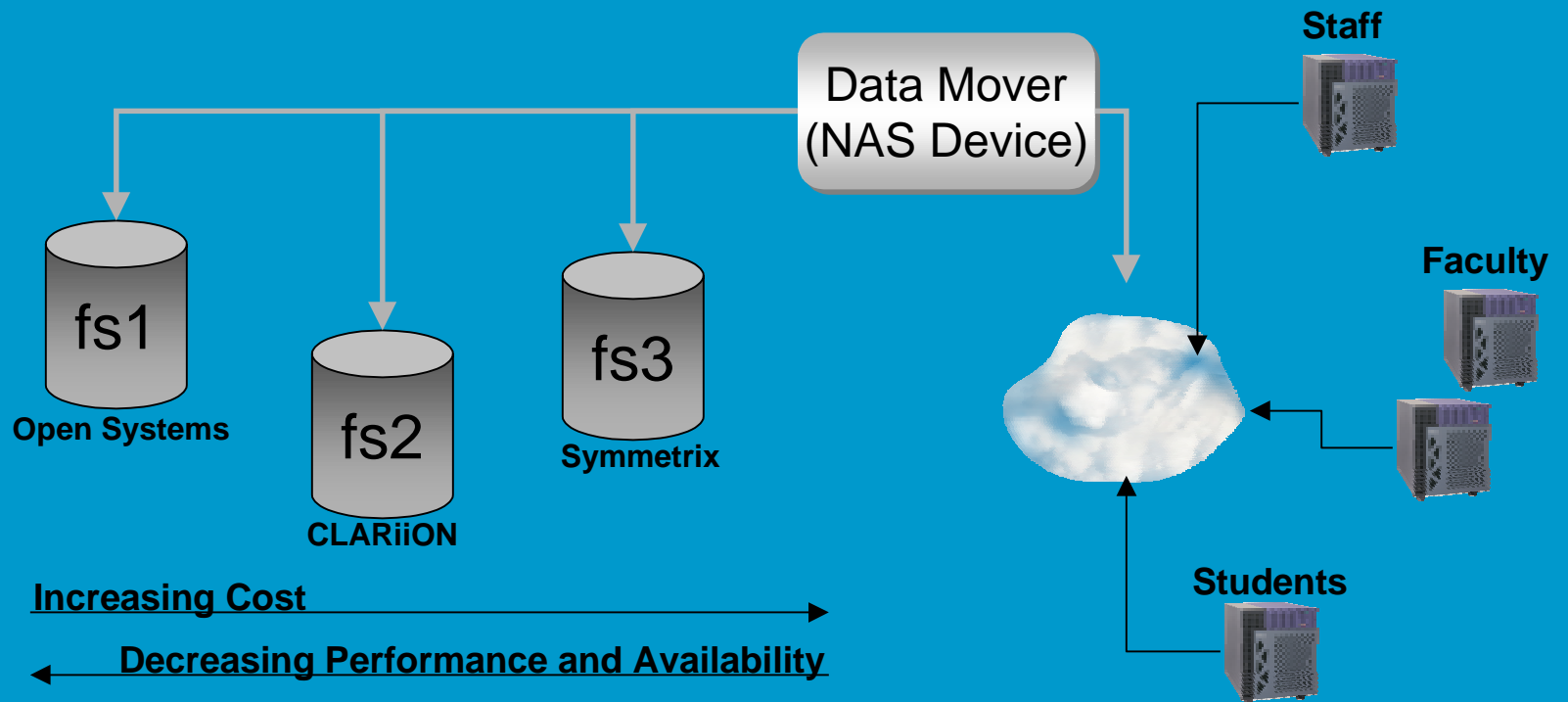




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Outlines a basic problem...

- How do we create tools to automate appropriate use?





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Solution approaches

- There are a few easy wins....
 - Snapshots (if you don't do in fs versioning)
 - Automatic Volume Management
 - Handles fs by fs granularity
- Requires is augmenting existing tools—
 - Online volume copies
 - Integration into existing AVM tools

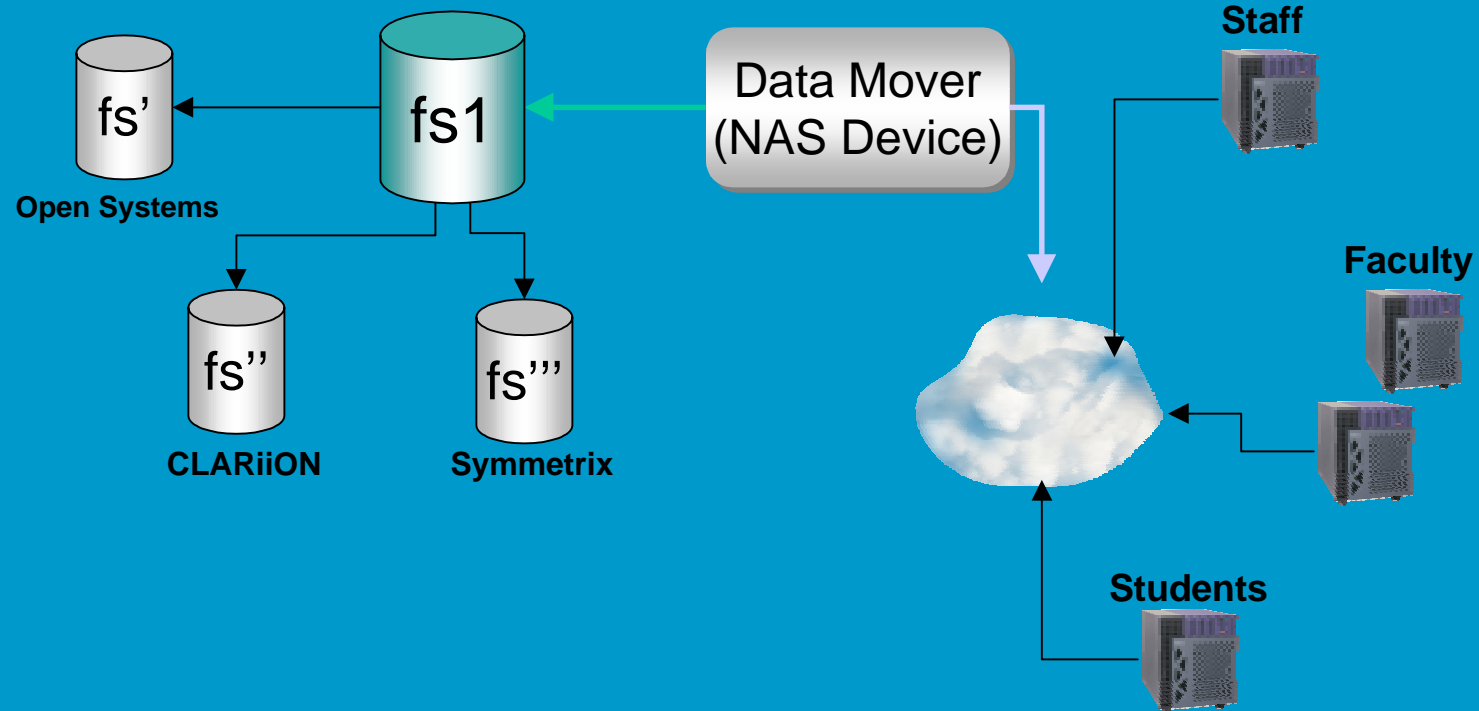
But customers are asking for considerably more....



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Policy based storage mgmt

- Borrows from HSM
- Allows a filesystem to intelligently span storage tiers





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Goals of storage level mgmt

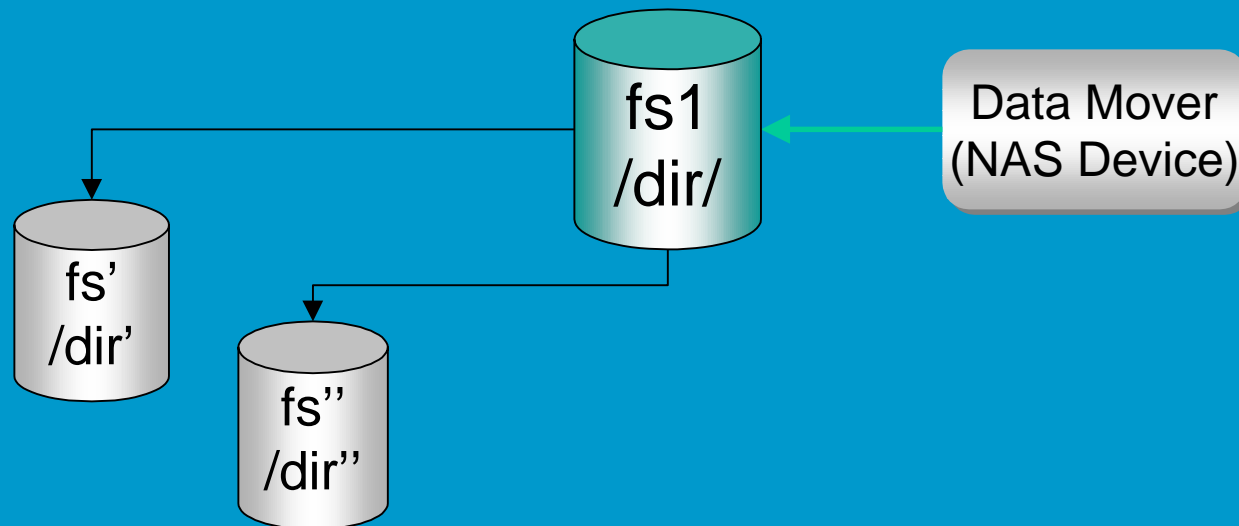
- **End goal**
 - The ability to set policies per user, per fs object, per object type
 - Policies affect block storage allocation on different storage tiers
 - Online, seamless 'data movement' from one tier to another
- **Tactical goals**
 - Filesystem development to handle online data movement, tiered storage tracking
 - Policy engine to exercise those features



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Meta-file systems

- Implementation of tiered filesystem
- Implementation of movement determined by granularity





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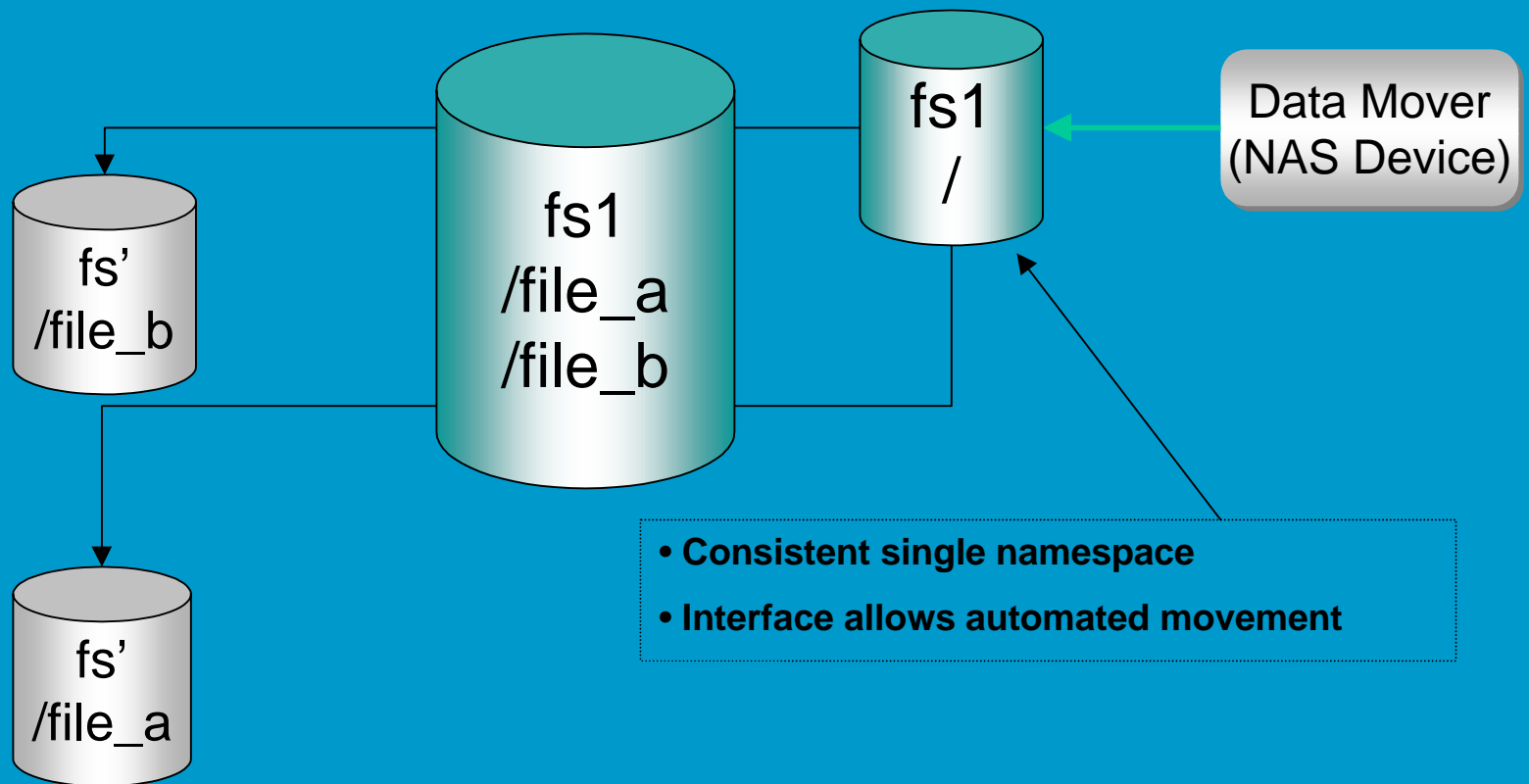
Metafs – What Granularity?

- Granularity of the filesystem sets the scope of the policy options
 - Filesystem Level
 - Directory Level
 - File Level
 - Block Level



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Meta-file systems





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Complexity of Policy Rules

- Automation and Policy Challenges
 - Complexity of rules \propto quantity of metadata required
 - Directory, perhaps LRA achievable inside FS
 - More complex automation policies driven through FS interface



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The developing market....

- Continuing attention to cost (both acquisition and management) will drive policy based storage decisions
- Storage growth needs to become a manageable challenge within constrained budgets.
 - Continuing storage growth (fueled through consolidation)
 - New market requirements (I.e. financial service non-repudiation requirements)